PATENT ABSTRACTS OF JAPAN

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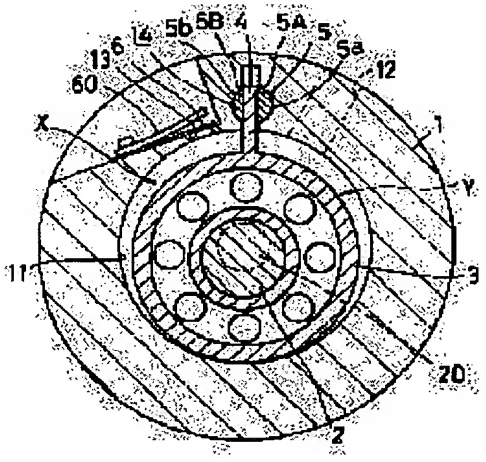
(54) SWING PISTON TYPE COMPRESSOR

(57)Abstract:
PURPOSE: To increase performance and reliability by reducing deterioration of a bush on the low pressure side while securing smooth oscillating rotation of each of the bushes at the time of using an oscillating guide bush consisting of two of the bushes.
CONSTITUTION: Outer peripheral circular arc length of a bush 5A on the low pressure side facing an inner peripheral surface on the low pressure side of a holding hole 14 provided on a cylinder 1 out of each of the bushes 5A, 5B of an oscillating guide bush 5 is made longer than outer peripheral circular arc length of the bush 5B on the high pressure side facing an inner peripheral surface on the high pressure side of the holding hole 14.



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CLAIMS

[Claim(s)]
[Claim 1] The roller which fits into a cylinder room (11) at the crank pin (2) which carries out interior, and carries out relative rotation to this crank pin (2) (3), The blade which is combined with a way in the shape of a protrusion outside this roller (3), and divides the interior of said cylinder room (11) to the hyperbaric chamber (X) which leads to the low pressure chamber (Y) which leads to inhalation opening (12), and a delivery (13) (4), It has the acceptance slot (51) which accepts the protrusion tip side of this blade (4) in attitude freedom. In the swing piston form compressor which equipped the maintenance hole (14) prepared in said cylinder room (11) with **** guide pin bushing (5) held possible [****] The radii die length of the peripheral face in the low-tension side bush (5A) of said **** guide pin bushing (5) facing the inner skin of said maintenance hole (14) The swing piston form compressor characterized by making it longer than the radii die length of the peripheral face in the high-tension-side bush (5B) of said **** guide pin bushing (5) facing the inner skin of said maintenance hole (14).
[Claim 2] The swing piston form compressor according to claim 1 which the outer diameter of the peripheral face in the low-tension side bush (5A) of **** guide pin bushing (5) differs from the outer diameter of the peripheral face in the high-tension-side bush (5B) of **** guide pin bushing (5), and is making the core of both the appearance in agreement.
[Claim 3] The swing piston form compressor according to claim 1 or 2 which has the core of the outer diameter of the peripheral face in the low-tension side bush (5A) of **** guide pin bushing (5), and the core of the outer diameter of the peripheral face in the high-tension-side bush (5B) of **** guide pin bushing (5) on the center line of a blade (4).
[Claim 4] The swing piston form compressor according to claim 1 which the outer diameter of the peripheral face in the low-tension side bush (5A) of **** guide pin bushing (5) and the outer diameter of the peripheral face in the high-tension-side bush (5B) of **** guide pin bushing (5) are the same, and the core of both the appearance is in agreement, and is located in a low-tension side bush (5A) side on both sides of the center line of a blade (4).

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention is used for a freezer etc., and it relates to the swing piston form compressor which is made to carry out a revolution drive and compressed the inhalation fluid, without making a roller rotate in the cylinder interior of a room.
[0002]
[Description of the Prior Art] the crank pin of the cylinder and the cylinder interior of a room as the former and a compressor -- relativity -- it having the roller fitted in pivotable, and, while preparing the blade prolonged towards the method of the outside of the direction of a path in the periphery section of this roller in the shape of one Between inhalation openings and the deliveries which are established in said cylinder, the maintenance hole of the circular cross section facing said cylinder room is formed. While arranging **** guide pin bushing which had the acceptance slot which accepts the protrusion tip side of said blade in attitude freedom in this maintenance hole By making the tip side of said blade insert in the acceptance slot of this bush, and performing compression operation, dividing the interior of said cylinder room with this blade to the hyperbaric chamber which leads to the low pressure chamber which leads to said inhalation opening, and said delivery The thing of the swing piston type which lessens the ullage of the fluid gas from said hyperbaric-chamber side to a low-pressure-chamber side, and raised compression efficiency is known for JP,6-323271,A etc.
[0003] Moreover, said **** guide pin bushing is made into the shape of a cylindrical shape of bilateral symmetry which it consists of two division bushes on either side fitted in said circular maintenance hole, and each [these] division bush had the circular face of the same outer diameter centering on the circular core of said maintenance hole in the external surface side, and had the flat side which follows said circular face in the inside side. And while making said each division bush fit in the inner skin of the high pressure which pinched the blade of each of that circular face inside said maintenance hole, and the low-tension side so that field contact may be carried out, he is trying to make said blade insert in the acceptance slot secured between the flat sides of each of said division bush.
[0004] In the acceptance slot between each [these] division bush, forward/backward moving of said blade can be carried out smoothly, making each division bush **** inside said maintenance hole by considering as the above configuration at the time of the revolution drive of the roller accompanying said crank pin.
[0005]
[Problem(s) to be Solved by the Invention] By the way, in the above compressor, at the time of fluid compression at said cylinder room, since the differential pressure of the hyperbaric chamber and low pressure chamber which are formed with said blade is very large and the high-pressure pressure by the side of this hyperbaric chamber is given to said blade, a big load will be applied to the division bush by the side of a low pressure chamber through this blade. Therefore, when using like before two division bushes made into bilateral symmetry, a load is equally given to each [these] bush, there are nothings and a big load will be given to the low-tension side bush of one side. Consequently, said blade was strongly forced to the flat side of a low-tension side bush, and the circular face of this low-tension side bush was strongly forced to the low-tension side inner skin of said maintenance hole, with the frictional resistance accompanying planar pressure increase of the low-tension side bush to said blade and maintenance hole etc., this low-tension side bush tended to deteriorate, and there was a problem in respect of the engine performance and dependability.
[0006] The purpose of this invention is to be able to reduce degradation of the low-tension side bush, and enable it to raise the engine performance and dependability, being able to secure smooth **** rotation of each division bush, when using **** guide pin bushing which consists of

two division bushes.
[0007]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, in invention according to claim 1 The roller 3 which fits into the cylinder room 11 at the crank pin 2 which carries out interior, and carries out relative rotation to this crank pin 2, The blade 4 which is combined with a way in the shape of a protrusion outside this roller 3, and divides the interior of said cylinder room 11 to the hyperbaric chamber X which leads to the low pressure chamber Y which leads to the inhalation opening 12, and a delivery 13, In the swing piston form compressor which equipped the maintenance hole 14 which has the acceptance slot 51 which accepts the protrusion tip side of this blade 4 in attitude freedom, and is prepared in said cylinder room 11 with the **** guide pin bushing 5 held possible [****] The radii die length of the peripheral face in low-tension side bush 5A of said **** guide pin bushing 5 which faces the inner skin of said maintenance hole 14 is made longer than the radii die length of the peripheral face in high-tension-side bush 5B of said **** guide pin bushing 5 which faces the inner skin of said maintenance hole 14.
[0008] The outer diameter of the peripheral face in low-tension side bush 5A of the **** guide pin bushing 5 is made to differ from the outer diameter of the peripheral face in high-tension-side bush 5B of the **** guide pin bushing 5, and the core of both the appearance is made in agreement in invention according to claim 2.
[0009] In invention according to claim 3, the core of the outer diameter of the peripheral face in low-tension side bush 5A of the **** guide pin bushing 5 and the core of the outer diameter of the peripheral face in high-tension-side bush 5B of the **** guide pin bushing 5 are located on the center line of a blade 4.
[0010] You make the core of both the appearance in agreement, using the outer diameter of the peripheral face in low-tension side bush 5A of the **** guide pin bushing 5, and the outer diameter of the peripheral face in high-tension-side bush 5B of the **** guide pin bushing 5 as the same, and are making it located in the low-tension side bush 5A side on both sides of the center line of a blade 4 in invention according to claim 4.
[0011]
[Function] When a big load is given to low-tension side bush 5A through a blade 4 by the high-pressure pressure by the side of the hyperbaric chamber X according to invention according to claim 1, Since the circular face which the radii die length of the peripheral face was formed for a long time than the radii die length of the peripheral face in high-tension-side bush 5B, and was made into the radii die-length size of said low-tension side bush 5A will be contacted by the low-tension side inner skin of the maintenance hole 14, That is, since the touch area of said low-tension side bush 5A to this maintenance hole 14 will increase to high-tension-side bush 5B In spite of applying a big load to this low-tension side bush 5A, frictional resistance per unit area between this low-tension side bush 5A and the maintenance hole 14 can be lessened by distributing and responding to this load by the whole big circular face of low-tension side bush 5A. Moreover, since the inside flat side of low-tension side bush 5A which contacts the low-tension side of said blade 4 by making the circular face of said low-tension side bush 5A into size also serves as area size, frictional resistance per unit area between the flat side of this area size and said blade 4 can also be lessened. Therefore, by mitigating the frictional resistance of low-tension side bush 5A to said blade 4 and maintenance hole 14, the proof stress of this low-tension side bush 5A can be heightened, and the engine performance and dependability can be raised.
[0012] Being able to raise proof stress like the case where it mentions above, by making the circular face of said low-tension side bush 5A into size according to invention according to claim 2 In spite of making the outer diameters of said low voltage and the high-tension-side bushes 5A and 5B differ, respectively and making both into the shape of an anomaly, positive **** rotation of said each bushes 5A and 5B with said blade 4 can be secured by having made the core of both the appearance in agreement.
[0013] According to invention according to claim 3, **** rotation of the core on the center line of said blade 4 can be smoothly carried out for each [these] bushes 5A and 5B as the

supporting point, being able to make this blade 4 move good in the core which faced across said each bushes 5A and 5B, since the outer-diameter core of each of said bushes 5A and 5B is located on the center line of said blade 4.
[0014] While forming the outer diameter of each of said bushes 5A and 5B in the shape of [whose core corresponded] isomorphism according to invention according to claim 4 Since this core is located in the low voltage bush 5A side on both sides of the center line of said blade 4, Being able to raise proof stress by making the periphery circular face of this low-tension side bush 5A into size, this maintenance hole 14 can be used as a single hole by the ability making into the diameter of the same the path of each inner skin of the maintenance hole 14 with which said each bushes 5A and 5B are inserted, and this maintenance hole 14 can be formed easily.
[0015]
[Example] Drawing 1 shows only the important section of a swing piston form compressor, and fits in the crank pin 2 prepared in the cylinder room 11 of a cylinder 1 at the driving shaft 20. While carrying out fitting of the roller 3 to this crank pin 2 and protruding a blade 4 on the periphery section in the shape of one towards the method of the outside of the direction of a path, between the inhalation openings 12 and the deliveries 13 which are established in said cylinder 1 Form the maintenance hole 14 which attends said cylinder room 11, and the **** guide pin bushing 5 which consists of the division bushes 5A and 5B comparatively used as these two maintenance holes 14 is fitted in. The interior of said cylinder room 11 is formed with this blade 4 to the hyperbaric chamber X which leads to the low pressure chamber Y which leads to said inhalation opening 12, and said delivery 13 by inserting the protrusion tip side of said blade 4 in attitude freedom in the acceptance slot 51 secured between each [these] bush 5A and 5B.
[0016] And he compresses the gas fluid inhaled in said low pressure chamber Y, and is trying to make it breathe out outside through a delivery 13 by carrying out a revolution drive from said hyperbaric chamber X, without making a roller 3 rotate in said cylinder room 11 with rotation of said crank pin 2. In addition, the discharge valve which prepared six in said delivery 13, and 60 are the valve guard among this drawing.
[0017] A deer is carried out and periphery circular face 5a of low-tension side bush 5A fitted in the low-pressure-chamber Y side of said maintenance hole 14 among said **** guide pin bushing 5 is formed in the above configuration for a long time than periphery circular face 5b of high-tension-side bush 5B in which it is fitted at the hyperbaric-chamber X side of said maintenance hole 14.
[0018] As drawing 2 shows, when the radius from the core O of R1 and said high-tension-side bush 5B to periphery circular face 5b is specifically set to R2 for the radius from the core O of said low-tension side bush 5A to periphery circular face 5a, R1> It forms so that it may be set to R2 and periphery circular face 5a of said low-tension side bush 5A may become size from periphery circular face 5b of high-tension-side bush 5B. And each [these] bushes 5A and 5B are formed as an area size in the shape of [from which an appearance differs mutually] a variant cylinder rather than 5d of flat sides opposite-**(ed) by the blade high-tension-side side face of high-tension-side bush 5B in flat side 5c opposite-**(ed) by the blade low-tension side side face of said low-tension side bush 5A.
[0019] Moreover, inner skin 14a in which low-tension side bush 5A of said maintenance hole 14 is fitted Or it forms in a major diameter a little. the same as that of the radius R1 of this bush 5A -- or -- a little -- a major diameter -- and the same as that of the radius R2 of this bush 5B in inner skin 14b of the maintenance hole 14 with which said high-tension-side bush 5B is fitted in -- While these each bushes 5A and 5B **** said each bushes 5A and 5B at the time of the forward/backward moving of a blade 4, each of that core O is made in agreement, and is made to fit in each [these] inner skin 14a and 14b, respectively so that **** rotation may be carried out.
[0020] At this time, the core O of each of said bushes 5A and 5B is made in agreement on the low-tension side side face of the blade 4 by which flat side 5c of low-tension side bush 5A is opposite-**(ed), and is set up, and the circular faces 5a and 5b of each of said bush bushes 5A and 5B and each inner skin 14a and 14b of said maintenance hole 14 are formed in the

supporting point for said core O in this drawing.
[0021] Moreover, as drawing 3 shows, make said each bushes 5A and 5B in agreement on the high-tension-side side face of the blade 4 which 5d of flat sides of high-tension-side bush 5B opposite-**, and they set up each of that core O. The radius R3 from said core O to periphery circular face 5a of said low-tension side bush 5A Each inner skin 14a and 14b of said maintenance hole 14 is formed so that it may become each [size, nothing, and / these] radii R3 and R4 with the diameter of the same mostly to the radius R4 to periphery circular face 5b of said high-tension-side bush 5B. You may make it make the supporting point carry out **** rotation of said core O for said each bushes 5A and 5B, making it **** to this each inner skin 14a and 14b.
[0022] Like drawing 4 , furthermore, said each bushes 5A and 5B Each of that core O is made in agreement, and it is set as the crosswise core of a blade 4. The radius R5 from this core O to periphery circular face 5a of said low-tension side bush 5A Each inner skin 14a and 14b of said maintenance hole 14 is formed so that it may become each [size, nothing, and / these] radii R5 and R6 with the diameter of the same mostly to the radius R6 to periphery circular face 5b of said high-tension-side bush 5B. You may make it make the supporting point carry out **** rotation of said core O for said each bushes 5A and 5B, making it **** to this each inner skin 14a and 14b.
[0023] When considering as the above configuration and a big load is given to low-tension side bush 5A through said blade 4 by the high-pressure pressure by the side of said hyperbaric chamber X at the time of compression operation of a compressor, The periphery circular face 5a is made into size to periphery circular face 5b of high-tension-side bush 5B. From field contact being carried out, to low-tension side inner skin 14a by which circular face 5a of said low-tension side bush 5A was made the path size of said maintenance hole 14 In spite of applying a big load to said low-tension side bush 5A, it distributes and responds to this load by the whole big circular face 5a of low-tension side bush 5A, and path Ochi peripheral surface 14a of the maintenance hole 14. Frictional resistance per [which is produced between circular face 5a of these low-tension side bush 5A and inner skin 14a of the maintenance hole 14] unit area can be lessened.
[0024] Moreover, since inside flat side 5c of low-tension side bush 5A which contacts the low-tension side of said blade 4 by making circular face 5a of said low-tension side bush 5A into size also becomes area size, frictional resistance per unit area between flat side 5c of this area size and said blade 4 can also be lessened. Therefore, it becomes possible by the frictional resistance of low-tension side bush 5A to said blade 4 and maintenance hole 14 being mitigable to heighten the proof stress of this low-tension side bush 5A, and to raise the engine performance and dependability. In spite of making the appearances of said low voltage and the high-tension-side bushes 5A and 5B differ, respectively and making both into the shape of an anomaly moreover, positive **** rotation of said each bushes 5A and 5B can be secured with the attitude of said blade 4 by making the core O of both the appearance mutually in agreement.
[0025] Moreover, **** rotation of the crosswise core of said blade 4 can be smoothly carried out for each [these] bushes 5A and 5B as the supporting point, being able to make this blade 4 move good like drawing 4 in the center position which faced across said each bushes 5A and 5B, when the core O of each of said bushes 5A and 5B is located in the crosswise core of said blade 4.
[0026] Furthermore, the periphery circular faces 5a and 5b of each of said bushes 5A and 5B As drawing 5 shows, while forming in the shape of [of the same radius R7 which uses each of that core O as the supporting point] radii, and making this each core O in agreement on the low-tension side side face of the blade 4 by which flat side 5c of said low-tension side bush 5A is opposite-**(ed) and arranging it You may make it form each inner skin 14a and 14b of said maintenance hole 14 so that it may become said radius R7 with the diameter of the same mostly by using said core O as the supporting point.
[0027] Since the periphery circular faces 5a and 5b of each of said bushes 5A and 5B are made into the same radius R7 and the core O is biased and established on the low-tension side side face of a blade 4, when ****(ing), Periphery circular face 5a of said low-tension side bush 5A is

made into size. The area of the flat side 5c as a size Being able to raise proof stress, as mentioned above, the path of each inner skin 14a and 14b of said maintenance hole 14 with which said each bushes 5A and 5B are inserted is made to the diameter of the same, respectively, and this maintenance hole 14 can be used as a single hole, therefore formation of this maintenance hole 14 becomes easy.

[0028]

[Effect of the Invention] Since the radii die length of the peripheral face in low-tension side bush 5A is formed for a long time than the thing of high-tension-side bush 5B according to invention according to claim 1 as explained above, When a big load is given to low-tension side bush 5A through a blade 4 by the high-pressure pressure by the side of the hyperbaric chamber X, By distributing and responding to this load by the whole big circular face of low-tension side bush 5A, and being able to lessen frictional resistance per unit area between this low-tension side bush 5A and the maintenance hole 14, and making the circular face of said low-tension side bush 5A into size The inside flat side of low-tension side bush 5A in contact with the low-tension side of said blade 4 is also made with area size. Frictional resistance per unit area between the flat side of this area size and said blade 4 can also be lessened. Consequently, the frictional resistance of low-tension side bush 5A to said blade 4 and maintenance hole 14 can be mitigated, the proof stress of this low-tension side bush 5A can be heightened, and the engine performance and dependability can be raised.

[0029] In spite of making said each bushes 5A and 5B into the shape of an anomaly according to invention according to claim 2, being able to raise proof stress like the case where it mentions above, by making the periphery circular face of said low-tension side bush 5A into size, positive **** rotation of said each bushes 5A and 5B with said blade 4 can be secured by having made the core of both the appearance in agreement.

[0030] According to invention according to claim 3, **** rotation of the core on the center line of said blade 4 can be smoothly carried out for these each bushes 5A and 5B at the supporting point, being able to make this blade 4 move good in the center position which faced across said each bushes 5A and 5B, since the outer-diameter core of each of said bushes 5A and 5B is located on the center line of said blade 4.

[0031] While forming the outer diameter of each of said bushes 5A and 5B in the shape of [whose core corresponded] isomorphism according to invention according to claim 4 Since this core is located in the low voltage bush 5A side on both sides of the center line of said blade 4, This maintenance hole 14 can be formed easily, being able to use the diameter of the same, nothing, and this maintenance hole 14 as a single hole for the path of each inner skin of the maintenance hole 14 with which said each bushes 5A and 5B are inserted, being able to raise proof stress by making the periphery circular face of this low-tension side bush 5A into size.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The plane section Fig. showing the important section of the swing piston form compressor concerning this invention.
[Drawing 2] The partial top view showing one example.
[Drawing 3] The top view showing another example.
[Drawing 4] The top view showing same another example.
[Drawing 5] The top view showing same another example.
[Description of Notations]
11 .... Cylinder room
12 .... Inhalation opening
13 .... Delivery
14 .... Maintenance hole
2 ..... Crank pin
3 ..... Roller
4 ..... Blade
5 ..... **** guide pin bushing
51 .... Acceptance slot
5A .... Low-tension side bush
5B .... High-tension-side bush
X ..... Hyperbaric chamber
Y ..... Low pressure chamber

[Translation done.]

(19)日本国特許庁（ＪＰ）　(12)**公開特許公報（Ａ）**　(11)特許出願公開番号

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審査請求　未請求　請求項の数４　ＯＬ　（全 ６ 頁）

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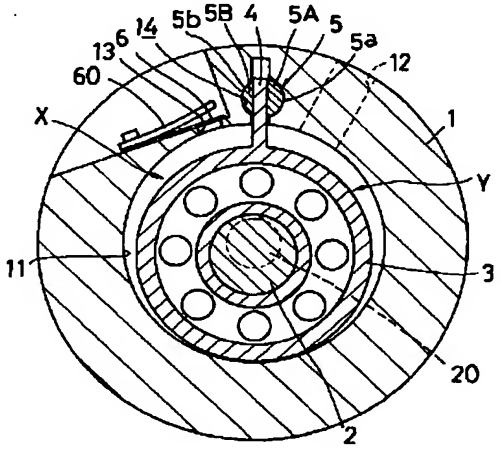
(54)【発明の名称】　スイングピストン形圧縮機

(57)【要約】

【目的】　２つのブッシュ５Ａ，５Ｂから成る揺動ガイドブッシュ５を用いるとき、各ブッシュ５Ａ，５Ｂの円滑な揺動回転を保障しながら、その低圧側ブッシュ５Ａの劣化を低減して性能及び信頼性を高める。

【構成】　揺動ガイドブッシュ５の各ブッシュ５Ａ，５Ｂのうち、シリンダ１に設けた保持孔１４の低圧側内周面に面する低圧側ブッシュ５Ａの外周円弧長さを、保持孔１４の高圧側内周面に面する高圧側ブッシュ５Ｂの外周円弧長さよりも長くした。



１１；シリンダ室　２；クランクピン　５；揺動ガイドブッシュ
１２；吸入口　３；ローラ　５Ａ；低圧側ブッシュ
１３；吐出口　４；ブレード　５Ｂ；高圧側ブッシュ
１４；保持孔　５１；受入溝
Ｘ；高圧室
Ｙ；低圧室

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【特許請求の範囲】

【請求項１】　シリンダ室（１１）に内装するクランクピン（２）に嵌合し、該クランクピン（２）に対し相対回転するローラ（３）と、このローラ（３）の外方に突出状に結合され、前記シリンダ室（１１）の内部を吸入口（１２）に通じる低圧室（Ｙ）と吐出口（１３）に通じる高圧室（Ｘ）とに区画するブレード（４）と、このブレード（４）の突出先端側を進退自由に受入れる受入溝（５１）をもち、前記シリンダ室（１１）に設ける保持孔（１４）に揺動可能に保持される揺動ガイドブッシュ（５）とを備えたスイングピストン形圧縮機において、前記保持孔（１４）の内周面に面する前記揺動ガイドブッシュ（５）の低圧側ブッシュ（５Ａ）における外周面の円弧長さを、前記保持孔（１４）の内周面に面する前記揺動ガイドブッシュ（５）の高圧側ブッシュ（５Ｂ）における外周面の円弧長さより長くすることを特徴とするスイングピストン形圧縮機。

【請求項２】　揺動ガイドブッシュ（５）の低圧側ブッシュ（５Ａ）における外周面の外径と、揺動ガイドブッシュ（５）の高圧側ブッシュ（５Ｂ）における外周面の外径とが異なり、かつ、その両外形の中心を一致させている請求項１記載のスイングピストン形圧縮機。

【請求項３】　揺動ガイドブッシュ（５）の低圧側ブッシュ（５Ａ）における外周面の外径の中心と、揺動ガイドブッシュ（５）の高圧側ブッシュ（５Ｂ）における外周面の外径の中心とが、ブレード（４）の中心線上にある請求項１又は請求項２記載のスイングピストン形圧縮機。

【請求項４】　揺動ガイドブッシュ（５）の低圧側ブッシュ（５Ａ）における外周面の外径と、揺動ガイドブッシュ（５）の高圧側ブッシュ（５Ｂ）における外周面の外径とが同一で、その両外形の中心が一致しており、かつ、ブレード（４）の中心線を挟んで低圧側ブッシュ（５Ａ）側に位置している請求項１記載のスイングピストン形圧縮機。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、例えば冷凍装置などに使用され、シリンダ室内でローラを自転させることなく公転駆動させて吸入流体を圧縮するようにしたスイングピストン形圧縮機に関する。

【０００２】

【従来の技術】従来、圧縮機として、シリンダと、そのシリンダ室内のクランクピンに相対回転可能に挿嵌されるローラとを備え、該ローラの外周部に径方向外方に向けて延びるブレードを一体状に設けると共に、前記シリンダに設ける吸入口と吐出口との間に、前記シリンダ室に臨む円形断面の保持孔を形成して、該保持孔に前記ブレードの突出先端側を進退自由に受入れる受入溝をもった揺動ガイドブッシュを配設する一方、このブッシュの

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受入溝に前記ブレードの先端側を挿入させて、該ブレードで前記シリンダ室の内部を前記吸入口に通じる低圧室と前記吐出口に通じる高圧室とに区画しながら圧縮運転を行うことにより、前記高圧室側から低圧室側への流体ガスの漏れ量を少なくして圧縮効率を高めるようにしたスイングピストンタイプのものは、例えば特開平６－３２３２７１号公報等で知られている。

【０００３】また、前記揺動ガイドブッシュは、前記円形保持孔に挿嵌される左右の２つの分割ブッシュから構成されており、これら各分割ブッシュは、その外面側に前記保持孔の円形中心部を中心とする同一外径の円弧面をもち、かつ、内面側には前記円弧面に連続するフラット面をもった左右同形の円柱形状とされている。そして、前記各分割ブッシュを、その各円弧面が前記保持孔の内部でブレードを挟んだ高圧及び低圧側の内周面に面接触するように挿嵌させると共に、前記各分割ブッシュのフラット面間に確保する受入溝に前記ブレードを挿入させるようにしている。

【０００４】以上の構成とすることにより、前記クランクピンに伴うローラの公転駆動時、前記保持孔の内部で各分割ブッシュを揺動させながら、これら各分割ブッシュ間の受入溝において前記ブレードを円滑に進退動させることができる。

【０００５】

【発明が解決しようとする課題】ところで、以上の圧縮機において、前記シリンダ室での流体圧縮時には、前記ブレードで画成される高圧室と低圧室との圧力差が非常に大きく、この高圧室側の高圧圧力が前記ブレードに付与されるため、該ブレードを介して低圧室側の分割ブッシュに大きな荷重がかかることになる。従って、従来のように、左右同形とされた２つの分割ブッシュを用いるときには、これら各ブッシュに均等に荷重が付与されことなく、一方側の低圧側ブッシュに大きな荷重が付与されることになる。この結果、前記ブレードが低圧側ブッシュのフラット面に強く押付けられ、また、該低圧側ブッシュの円弧面が前記保持孔の低圧側内周面に強く押付けられて、前記ブレードや保持孔に対する低圧側ブッシュの面圧増大に伴う摩擦抵抗などにより、この低圧側ブッシュが劣化し易くて性能及び信頼性の点で問題があった。

【０００６】本発明の目的は、２つの分割ブッシュから成る揺動ガイドブッシュを用いるとき、各分割ブッシュの円滑な揺動回転を保障できながら、その低圧側ブッシュの劣化を低減できて性能及び信頼性を高め得るようにすることにある。

【０００７】

【課題を解決するための手段】上記目的を達成するため、請求項１記載の発明では、シリンダ室１１に内装するクランクピン２に嵌合し、該クランクピン２に対し相対回転するローラ３と、このローラ３の外方に突出状に

結合され、前記シリンダ室１１の内部を吸入口１２に通じる低圧室Ｙと吐出口１３に通じる高圧室Ｘとに区画するブレード４と、このブレード４の突出先端側を進退自由に受入れる受入溝５１をもち、前記シリンダ室１１に設ける保持孔１４に揺動可能に保持される揺動ガイドブッシュ５とを備えたスイングピストン形圧縮機において、前記保持孔１４の内周面に面する前記揺動ガイドブッシュ５の低圧側ブッシュ５Ａにおける外周面の円弧長さを、前記保持孔１４の内周面に面する前記揺動ガイドブッシュ５の高圧側ブッシュ５Ｂにおける外周面の円弧長さより長くしている。

【０００８】請求項２記載の発明では、揺動ガイドブッシュ５の低圧側ブッシュ５Ａにおける外周面の外径と、揺動ガイドブッシュ５の高圧側ブッシュ５Ｂにおける外周面の外径とを異ならしめ、その両外形の中心を一致させている。

【０００９】請求項３記載の発明では、揺動ガイドブッシュ５の低圧側ブッシュ５Ａにおける外周面の外径の中心と、揺動ガイドブッシュ５の高圧側ブッシュ５Ｂにおける外周面の外径の中心とを、ブレード４の中心線上に位置させている。

【００１０】請求項４記載の発明では、揺動ガイドブッシュ５の低圧側ブッシュ５Ａにおける外周面の外径と、揺動ガイドブッシュ５の高圧側ブッシュ５Ｂにおける外周面の外径とを同一として、その両外形の中心を一致させ、かつ、ブレード４の中心線を挟んで低圧側ブッシュ５Ａ側に位置させている。

【００１１】

【作用】請求項１記載の発明によれば、高圧室Ｘ側の高圧圧力によりブレード４を介して低圧側ブッシュ５Ａに大きな荷重が付与されたとき、その外周面の円弧長さは高圧側ブッシュ５Ｂにおける外周面の円弧長さよりも長く形成され、前記低圧側ブッシュ５Ａの円弧長さ大とされた円弧面が保持孔１４の低圧側内周面に接触されることになるため、つまり、該保持孔１４に対する前記低圧側ブッシュ５Ａの接触面積が高圧側ブッシュ５Ｂに対し増大されることになるから、この低圧側ブッシュ５Ａに大きな荷重がかかるにも拘らず、該荷重を低圧側ブッシュ５Ａの大きな円弧面全体で分散して受け止めることにより、この低圧側ブッシュ５Ａと保持孔１４との間の単位面積当りの摩擦抵抗を少なくできる。また、前記低圧側ブッシュ５Ａの円弧面を大とすることにより、前記ブレード４の低圧側に接触する低圧側ブッシュ５Ａの内側フラット面も面積大となることから、この面積大のフラット面と前記ブレード４との間の単位面積当りの摩擦抵抗も少なくできる。従って、前記ブレード４や保持孔１４に対する低圧側ブッシュ５Ａの摩擦抵抗を軽減することにより、この低圧側ブッシュ５Ａの耐力を高めて性能及び信頼性を向上させることができる。

【００１２】請求項２記載の発明によれば、前述した場合と同様に、前記低圧側ブッシュ５Ａの円弧面を大として耐力を向上させることができながら、前記低圧及び高圧側ブッシュ５Ａ，５Ｂの外径をそれぞれ異ならしめて両者を異形状とするにも拘らず、その両外形の中心を一致させたことにより、前記ブレード４による前記各ブッシュ５Ａ，５Ｂの確実な揺動回転を保障できる。

【００１３】請求項３記載の発明によれば、前記各ブッシュ５Ａ，５Ｂの外径中心が前記ブレード４の中心線上に位置されているため、このブレード４を前記各ブッシュ５Ａ，５Ｂを挟んだ中心部において良好に進退させることができながら、これら各ブッシュ５Ａ，５Ｂを前記ブレード４の中心線上の中心を支点として円滑に揺動回転させることができる。

【００１４】請求項４記載の発明によれば、前記各ブッシュ５Ａ，５Ｂの外径を中心が一致した同形状に形成すると共に、該中心を前記ブレード４の中心線を挟んで低圧ブッシュ５Ａ側に位置させているため、この低圧側ブッシュ５Ａの外周円弧面を大として耐力を向上させることができながら、前記各ブッシュ５Ａ，５Ｂが挿入される保持孔１４の各内周面の径を同一径として、該保持孔１４を単一孔とすることができ、この保持孔１４を容易に形成できる。

【００１５】

【実施例】図１はスイングピストン形圧縮機の要部のみを示しており、シリンダ１のシリンダ室１１に駆動軸２０に設けたクランクピン２を挿嵌し、該クランクピン２にローラ３を嵌合させて、その外周部に径方向外方に向けてブレード４を一体状に突設すると共に、前記シリンダ１に設ける吸入口１２と吐出口１３との間には、前記シリンダ室１１に臨む保持孔１４を形成して、該保持孔１４に２つ割りとされた分割ブッシュ５Ａ，５Ｂから成る揺動ガイドブッシュ５を挿嵌し、これら各ブッシュ５Ａ，５Ｂ間に確保される受入溝５１に前記ブレード４の突出先端側を進退自由に挿入することにより、該ブレード４で前記シリンダ室１１の内部を前記吸入口１２に通じる低圧室Ｙと前記吐出口１３に通じる高圧室Ｘとに画成している。

【００１６】そして、前記クランクピン２の回転に伴い前記シリンダ室１１内でローラ３を自転させることなく公転駆動させることにより、前記低圧室Ｙに吸入されたガス流体を圧縮して、前記高圧室Ｘから吐出口１３を経て外部に吐出させるようにしている。尚、同図中、６は前記吐出口１３に設けた吐出弁、６０はその弁押えである。

【００１７】しかして、以上の構成において、前記揺動ガイドブッシュ５のうち、前記保持孔１４の低圧室Ｙ側に挿嵌される低圧側ブッシュ５Ａの外周円弧面５ａを、前記保持孔１４の高圧室Ｘ側に挿嵌される高圧側ブッシュ５Ｂの外周円弧面５ｂよりも長く形成する。

【００１８】具体的には、図２で示すように、前記低圧

側ブッシュ５Ａの中心Ｏから外周円弧面５ａまでの半径をＲ１、また、前記高圧側ブッシュ５Ｂの中心Ｏから外周円弧面５ｂまでの半径をＲ２としたとき、Ｒ１＞Ｒ２となって、前記低圧側ブッシュ５Ａの外周円弧面５ａが高圧側ブッシュ５Ｂの外周円弧面５ｂよりも大となるように形成し、かつ、前記低圧側ブッシュ５Ａのブレード低圧側側面に対接されるフラット面５ｃを、高圧側ブッシュ５Ｂのブレード高圧側側面に対接されるフラット面５ｄよりも面積大として、これら各ブッシュ５Ａ，５Ｂを互いに外形が異なる異形円柱状に形成する。

【００１９】また、前記保持孔１４の低圧側ブッシュ５Ａが挿嵌される内周面１４ａを、該ブッシュ５Ａの半径Ｒ１と同一乃至やや大径に、かつ、前記高圧側ブッシュ５Ｂが挿嵌される保持孔１４の内周面１４ｂを、このブッシュ５Ｂの半径Ｒ２と同一乃至やや大径に形成して、これら各内周面１４ａ，１４ｂにそれぞれ前記各ブッシュ５Ａ，５Ｂを、該各ブッシュ５Ａ，５Ｂがブレード４の進退動時に摺接しながら揺動回転されるように、その各中心Ｏを一致させて挿嵌させる。

【００２０】このとき、同図では、前記各ブッシュ５Ａ，５Ｂの中心Ｏを、低圧側ブッシュ５Ａのフラット面５ｃが対接されるブレード４の低圧側側面上に一致させて設定し、前記中心Ｏを支点に前記各ブッシュブッシュ５Ａ，５Ｂの円弧面５ａ，５ｂと前記保持孔１４の各内周面１４ａ，１４ｂとを形成している。

【００２１】また、前記各ブッシュ５Ａ，５Ｂは、図３で示すように、その各中心Ｏを高圧側ブッシュ５Ｂのフラット面５ｄが対接するブレード４の高圧側側面上に一致させて設定し、前記中心Ｏから前記低圧側ブッシュ５Ａの外周円弧面５ａまでの半径Ｒ３を、前記高圧側ブッシュ５Ｂの外周円弧面５ｂまでの半径Ｒ４に対し大となし、かつ、これら各半径Ｒ３，Ｒ４とほぼ同一径となるように前記保持孔１４の各内周面１４ａ，１４ｂを形成して、該各内周面１４ａ，１４ｂに摺接させながら前記各ブッシュ５Ａ，５Ｂを前記中心Ｏを支点に揺動回転させるようにしてもよい。

【００２２】さらに、図４のように、前記各ブッシュ５Ａ，５Ｂは、その各中心Ｏを一致させてブレード４の幅方向中心部に設定し、該中心Ｏから前記低圧側ブッシュ５Ａの外周円弧面５ａまでの半径Ｒ５を、前記高圧側ブッシュ５Ｂの外周円弧面５ｂまでの半径Ｒ６に対し大となし、かつ、これら各半径Ｒ５，Ｒ６とほぼ同一径となるように前記保持孔１４の各内周面１４ａ，１４ｂを形成して、該各内周面１４ａ，１４ｂに摺接させながら前記各ブッシュ５Ａ，５Ｂを前記中心Ｏを支点に揺動回転させるようにしてもよい。

【００２３】以上の構成とするときには、圧縮機の圧縮運転時に、前記高圧室Ｘ側の高圧圧力により前記ブレード４を介して低圧側ブッシュ５Ａに大きな荷重が付与されたとき、その外周円弧面５ａが高圧側ブッシュ５Ｂの外周円弧面５ｂに対し大とされて、前記低圧側ブッシュ５Ａの円弧面５ａが前記保持孔１４の径大とされた低圧側内周面１４ａに面接触されることから、前記低圧側ブッシュ５Ａに大きな荷重がかかるにも拘らず、該荷重を低圧側ブッシュ５Ａの大きな円弧面５ａの全体と保持孔１４の径大内周面１４ａとで分散して受け止め、これら低圧側ブッシュ５Ａの円弧面５ａと保持孔１４の内周面１４ａとの間に生じる単位面積当りの摩擦抵抗を少なくできる。

【００２４】また、前記低圧側ブッシュ５Ａの円弧面５ａを大とすることにより、前記ブレード４の低圧側に接触する低圧側ブッシュ５Ａの内側フラット面５ｃも面積大となることから、この面積大のフラット面５ｃと前記ブレード４との間の単位面積当りの摩擦抵抗も少なくできる。従って、前記ブレード４や保持孔１４に対する低圧側ブッシュ５Ａの摩擦抵抗を軽減できることにより、この低圧側ブッシュ５Ａの耐力を高めて性能及び信頼性を向上させることが可能となる。その上、前記低圧及び高圧側ブッシュ５Ａ，５Ｂの外形をそれぞれ異ならしめて両者を異形状とするにも拘らず、その両外形の中心Ｏを互いに一致させていることにより、前記ブレード４の進退に伴い前記各ブッシュ５Ａ，５Ｂの確実な揺動回転を保障できる。

【００２５】また、図４のように、前記各ブッシュ５Ａ，５Ｂの中心Ｏを前記ブレード４の幅方向中心部に位置させるときには、このブレード４を前記各ブッシュ５Ａ，５Ｂを挟んだ中心位置において良好に進退させることができながら、これら各ブッシュ５Ａ，５Ｂを前記ブレード４の幅方向中心部を支点として円滑に揺動回転させることができる。

【００２６】さらに、前記各ブッシュ５Ａ，５Ｂの外周円弧面５ａ，５ｂは、図５で示すように、その各中心Ｏを支点とする同一半径Ｒ７の円弧状に形成し、かつ、該各中心Ｏを前記低圧側ブッシュ５Ａのフラット面５ｃが対接されるブレード４の低圧側側面上に一致させて配置すると共に、前記中心Ｏを支点として前記半径Ｒ７とほぼ同一径となるように前記保持孔１４の各内周面１４ａ，１４ｂを形成するようにしてもよい。

【００２７】斯くするときには、前記各ブッシュ５Ａ，５Ｂの外周円弧面５ａ，５ｂが同一半径Ｒ７とされ、かつ、その中心Ｏがブレード４の低圧側側面上に偏位して設けられているため、前記低圧側ブッシュ５Ａの外周円弧面５ａを大とし、かつ、そのフラット面５ｃの面積も大として、前述したように耐力を向上させることができながら、前記各ブッシュ５Ａ，５Ｂが挿入される前記保持孔１４の各内周面１４ａ，１４ｂの径をそれぞれ同一径にできて、該保持孔１４を単一孔とすることができ、従って、この保持孔１４の形成が容易となる。

【００２８】

【発明の効果】以上説明したように、請求項１記載の発

明によれば、低圧側ブッシュ５Ａにおける外周面の円弧長さが高圧側ブッシュ５Ｂのものよりも長く形成されているため、高圧室Ｘ側の高圧圧力によりブレード４を介して低圧側ブッシュ５Ａに大きな荷重が付与されたとき、該荷重を低圧側ブッシュ５Ａの大きな円弧面全体で分散して受け止め、この低圧側ブッシュ５Ａと保持孔１４との間での単位面積当りの摩擦抵抗を少なくでき、また、前記低圧側ブッシュ５Ａの円弧面を大とすることにより、前記ブレード４の低圧側に接触する低圧側ブッシュ５Ａの内側フラット面も面積大となして、この面積大のフラット面と前記ブレード４との間での単位面積当りの摩擦抵抗も少なくでき、この結果、前記ブレード４や保持孔１４に対する低圧側ブッシュ５Ａの摩擦抵抗を軽減できて、該低圧側ブッシュ５Ａの耐力を高めて性能及び信頼性を向上させることができる。

【００２９】請求項２記載の発明によれば、前述した場合と同様に、前記低圧側ブッシュ５Ａの外周円弧面を大として耐力を向上させることができながら、前記各ブッシュ５Ａ，５Ｂが異形状とされるにも拘らず、その両外形の中心を一致させたことにより、前記ブレード４による前記各ブッシュ５Ａ，５Ｂの確実な揺動回転を保障できる。

【００３０】請求項３記載の発明によれば、前記各ブッシュ５Ａ，５Ｂの外径中心を前記ブレード４の中心線上に位置させているため、このブレード４を前記各ブッシュ５Ａ，５Ｂを挟んだ中心位置において良好に進退させることができながら、該各ブッシュ５Ａ，５Ｂを前記ブレード４の中心線上の中心を支点に円滑に揺動回転させることができる。

【００３１】請求項４記載の発明によれば、前記各ブッシュ５Ａ，５Ｂの外径を中心が一致した同形状に形成すると共に、該中心を前記ブレード４の中心線を挟んで低圧ブッシュ５Ａ側に位置させているため、この低圧側ブッシュ５Ａの外周円弧面を大として耐力を向上させることができながら、前記各ブッシュ５Ａ，５Ｂが挿入される保持孔１４の各内周面の径を同一径となし、該保持孔１４を単一孔とすることができて、この保持孔１４を容易に形成できる。

【図面の簡単な説明】

【図１】本発明にかかるスイングピストン形圧縮機の要部を示す平断面図。

【図２】１つの実施例を示す部分的な平面図。

【図３】別の実施例を示す平面図。

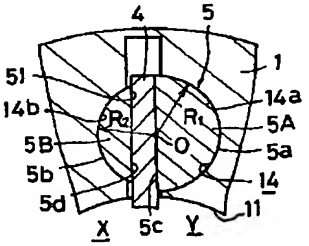
【図４】同じく別の実施例を示す平面図。

【図５】同じく別の実施例を示す平面図。

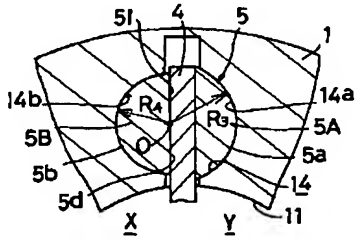
【符号の説明】

１１……シリンダ室
１２……吸入口
１３……吐出口
１４……保持孔
２……クランクピン
３……ローラ
４……ブレード
５……揺動ガイドブッシュ
５１……受入溝
５Ａ……低圧側ブッシュ
５Ｂ……高圧側ブッシュ
Ｘ……高圧室
Ｙ……低圧室

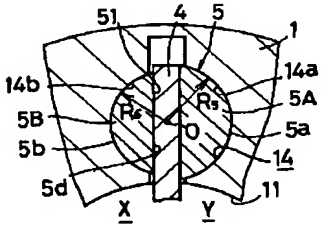
【図２】



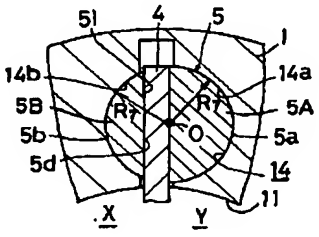
【図３】



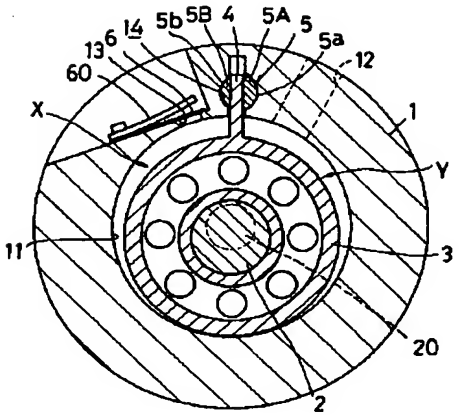
【図４】



【図５】



【図１】



１１；シリンダ室　　２；クランクピン　　５；揺動ガイドブッシュ
１２；吸入口　　３；ローラ　　５Ａ；低圧側ブッシュ
１３；吐出口　　４；ブレード　　５Ｂ；高圧側ブッシュ
１４；保持孔　　５１；受入溝
Ｘ；高圧室
Ｙ；低圧室

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